Claims

1. Method for pretreating via centrifuging samples contained in tubes (T) placed in containers (P) prior to being introduced into an automatic analysis device (AA), the centrifuging being effected in a centrifugal machine (CE) comprising a rotor with a vertical axis, a plurality of boats (NA) being mounted tilting at the periphery of said rotor, said boats being able to each contain one container (P) with tubes of samples (T), characterised in that it comprises :

- the detection of the presence of tubes (T) inside the containers (P) at the time they are transported to the centrifugal machine (CE) ;
- the detection of a foreseeable lack of balance of the centrifugal machine (CE) and when this detection reveals the presence of this lack of balance owing to the presence of incomplete containers or an odd number of containers (P);
- the simulation of the load of the centrifugal machine (CE) incorporating the incomplete container (P);
- the selection of a balancing container (PE_1, PE_2) according to the number of tubes missing in the incomplete container (P) ;
- the determination of the boat (NA) of the centrifugal machine (CE) inside which the balancing container (PE_1, PE_2) needs to be arranged so as to obtain a good balancing of the load ;
- the placing of this container (P) in said boat (NA) in the place of the samples container which would be there, thus provoking a shift in the order of the introduction of the balancing containers (P) in the centrifugal machine (CE) ;
- the putting back of the balancing container (PE_1, PE_2) on its storage area at the time of transferring the sample containers to the automatic analysis device (AA) once centrifuging has been carried out.

2. Method according to claim 1, characterised in that, in the case where the capacity of the containers is five tubes and where the centrifugal machine tolerates a lack of balance equal at least to that brought about by the absence of a tube, it only uses two balancing containers respectively corresponding to one container containing two tubes and one container containing four tubes so as to compensate all the possible lacks of balance.

3. Method according to claim 1 or 2, characterised in that, so as to determine the positioning of the containers inside the centrifugal machine, it comprises the stages for constructing a virtual rotor (block B_1) containing the containers (P) in which the presence of the tubes (T) has been detected by presence detectors, the calculation of the optimum arrangement (block B_2) and of the unbalance of this arrangement, a test to know if the unbalance is correct or not, the balancing treatment ending (block B_4) if the unbalance is correct, and in the case where the unbalance is incorrect, the determination of the state (full or empty) of the centrifugal machine (block B_5) if a place exists, a balancing container is added to the virtual rotor (block B_6), the optimum arrangement (block B_7) is calculated, if the new unbalance of the rotor is correct (block B_8), the balancing treatment ends; if the new unbalance is incorrects, the balancing container (block B_9) is eliminated followed by a test to know if there is a container able to be eliminated (block B_{10}), and if this is not the case the treatment ends and an error signal (block B_{11}) is triggered whereas if there is a container able to be eliminated the last container from the virtual rotor (block B_{12}) is eliminated and the optimum arrangement (block B_{13}) is calculated, and then in the case where the unbalance of the rotor is incorrect (block B_{14}), return to the balancing addition stage (block B_6), the treatment being ended if this unbalance is correct.

4. Method according to claim 3, characterised in that, if during the test carried out to know if the centrifugal machine is full (block B_5), the virtual rotor is full, it comprises a direct passage to the determination stage if there exists a container able to be suppressed (block B_{10}).

5. Method according to claim 3 or 4, characterised in that the stage for finding an optimum rotor successively comprises the calculation of the rotor of the unbalance of the rotor (block B_{25}), the determination of the optimum rotor and of the optimum unbalance (block B_{26}), a test to know if the unbalance is lower than a predetermined threshold (block B_{27}) and lower than the optimum unbalance (block B_{28}), if the unbalance is lower than said threshold, the search for the optimum rotor ends ; if the unbalance is lower than the optimum unbalance (block B_{28}), the determination is made of the optimum rotor and of the optimum unbalance (block B_{29}) and of the existence of a possible permutation (block B_{30}), it being understood that if the unbalance is lower than the optimum unbalance (block B_{28}) the system passes directly to (block B_{30}), the search ends if no permutation is possible, whereas if a permutation is possible the system carries out the permutation (block B_{31}), calculates the unbalance of the rotor (block B_{32}) and then returns to the block (B_{27}) for a new sequence.

6. Device for implementing the method according to one of the preceding claims, characterised in that it comprises a feeding station (PA_2) placed along one lateral side of the centrifugal machine (CE) opposite a feeding station of the analysis robot, this feeding station comprising a first thrustor (PM_1) able to move in translation and used to extract the containers (P) contained in the feeding station (PA_1), bring them into a storage area (AS_1) adjacent to a belt conveyor (BT) which circulates parallel to the rear side (CP) of the centrifugal machine (CE) perpendicular to the displacement axis of the thrustor (PM_1), a grasping mechanism (MP) able to transfer the containers situated on the belt conveyor into the boats of the centrifugal machine which

come out of an opening situated in a feeding area (AL) and bring them back onto the belt conveyor after centrifuging, said belt conveyor transporting the centrifugal thrustors to a transport area situated on one lateral side (CL_2) of the centrifugal machine adjacent to the feeding station (PA_2) of the robot (AA), said transport area comprising a second thrustor (PM_2) able to move perpendicular to the running off direction of the belt conveyor (BT) so as to transfer via a translation movement the containers brought by the belt conveyor (BT) into the feeding station of the robot (AA).

7. Device according to claim 6, characterised in that the distribution of the containers (P) in the feeding station (PA_1) of the robot (AA) is effected by means of an endless belt (CS) mounted on rollers axed vertically and bearing a drive cam.

8. Device according to claim 6 or 7, characterised in that it comprises a device for detecting the presence of tubes inside the containers at the time they move from the feeding station (PA_2) to the belt conveyor, this detection device (DP) comprising a row of detection jacks axed perpendicular to the displacement axis of the containers (P) and mounted on a structure able to move in translation above the containers (P) from the station (PA_2) to the belt conveyor (BT).

9. Device according to claim 8, characterised in that said mobile structure of the device is integral with the structure of said grasping device.